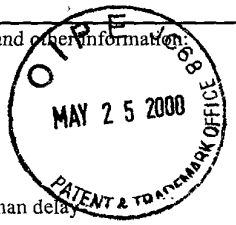
FORM PTO-1390 (REV 5-93) U S DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	**178/48916**
	U S APPLICATION NO (if known, see 37 CFR 1 5) (Not Yet Assigned) **09/555140**

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP98/07487	**20 November 1998**	**25 November 1997**

TITLE OF INVENTION
FILTER ELEMENT

APPLICANT(S) FOR DO/EO/US
Gunnar-Marcel KLEIN, Nikolaus MOSER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:



1. [X] This is **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371

3. [ ] This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).

4. [X] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2)

   a. [ ] is transmitted herewith (required only if not transmitted by the International Bureau).

   b. [X] has been transmitted by the International Bureau

   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US)

6. [ ] A translation of the International Application into English (35 U.S.C. 371(c)(2).

7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))

   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).

   b. [ ] have been transmitted by the International Bureau.

   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.

   d. [ ] have not been made and will not be made.

8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3).

9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (unexecuted)

10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Item 11. to 16. below concern other document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. [ ] A FIRST preliminary amendment.

    [ ] A SECOND or SUBSEQUENT preliminary amendment.

14. [ ] A substitute specification.

15. [ ] A change of power of attorney and/or address letter.

16. [X] Other items or information:
    Form PCT/IB/308

U S APPLICATION NO (if known, see 37 CFR 1 5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
{Not Yet Assigned} 09/555140	PCT/EP98/07487	178/48916

17. [X] The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5):		
Search Report has been prepared by the EPO or JPO $840.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) ... $670.00		
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2) $760.00		
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37CFR 1.445(a)(2) paid to USPTO980.00 ..... $970.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)92.00 ..... $96.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840.00	
Surcharge of $130.00 for furnishing the oath or declaration later than [] 20 [X] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130.00	

Claims	Number Field	Number Extra	Rate		
Total Claims	12-20=		X $18.00	$	
Independent Claims	2-3=		X $78.00	$	
Multiple dependent claims(s) (if applicable)			+ $260.00	$	
TOTAL OF ABOVE CALCULATIONS =				$	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				$	
SUBTOTAL =				$	
Processing fee of $130.00 for furnishing the English translation later than [ ] 20 [X] 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$ 130.00	
TOTAL NATIONAL FEE =				$	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28,3.31). $40.00 per property +				$	
TOTAL FEE ENCLOSED =				**$ 1,100.00**	
				Amount to be: refunded	$
				charged	$

a. [X] A check in the amount of **$ 1,100.00** to cover the above fees is enclosed.
b. [ ] Please charge my Deposit Account No. _____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.
c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **05-1323**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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NAME
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REGISTRATION NUMBER
25 May 2000
DATE

Attorney Docket No. 178/48916

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Stage Patent Application of

Gunnar-Marcal KLEIN et al.

Serial No.: 09/555,140
PCT/EP98/07487

Filed: November 20, 1998

For: FILTER ELEMENT

PRELIMINARY AMENDMENT

Box PCT
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Preliminary to examination of the accompanying PCT National Stage application, kindly amend the application as follows:

In the specification:

Page 1, line 1, please delete "State of the Art" and insert the heading -- BACKGROUND OF THE INVENTION --;

lines 2 and 3, delete "according to the preamble of the main claim".

Page 2, line 11, delete "Object of the Invention" and insert the heading heading -- SUMMARY OF THE INVENTION --;

line 15, delete "Advantages of the Invention".

Page 5, last line, delete "in the subclaims" and insert in lieu thereof -- hereinafter --.

Page 6, line 1, delete "Drawing" and insert the heading -- BRIEF DESCRIPTION OF THE DRAWINGS --;

line 14, delete "Description of Working Embodiments" and insert the heading -- DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS --.

In the claims:

Please cancel original claims 1 through 12, without prejudice or disclaimer, and substitute therefor the following new claims 13 through 34:

13. A filter element comprising a plurality of filter medium layers joined together such that a fluid to be filtered flows successively through the layers in a flow direction commencing with an inflow layer and ending with a discharge layer, wherein successive layers in said flow direction exhibit an increasing degree of separation and a decreasing storage capacity for particles to be filtered out of said fluid, and wherein said inflow layer is comprised of synthetic fibers and said discharge layer is comprised of a predominantly cellulose-containing filter paper.

14. A filter element according to claim 13, wherein the inflow layer is a melt-blown nonwoven web with a weight per unit area of approximately 15 to 150 g/m^2, and the discharge layer is a predominantly cellulose-containing, optionally calandared or compressed, filter paper having a weight per unit area of about 50 to 200 g/m^2.

15. A filter element according to claim 13, wherein at least three filter medium layers are joined together; wherein the discharge layer is a predominantly cellulose-containing filter paper which serves primarily to stabilize the filter element; wherein all the other layers are nonwoven webs made of synthetic fibers, and wherein said other layers in the direction of flow through the filter successively exhibit an increased degree of separation and a decreased storage capacity for particles to be filtered out from the fluid flowing through the filter element.

16. A filter element according to claim 15, wherein an intermediate filter medium layer located between the inflow-side filter medium and the outflow-side filter medium comprises an optionally calandared melt-blown nonwoven web having a weight per unit area of 15 to 150 g/m^2.

17. A filter element according to claim 13, wherein the filter media joined together to form the filter element are star-folded.

18. A filter element according to claim 13, wherein the layers of filter medium are welded together by ultrasound.

19. A filter element according to claim 13, wherein the layers of filter medium are joined together by surface pressure during a folding process.

20. A filter element according to claim 13, wherein the layers of filter medium are adhesively bonded together by gluing with powdered adhesive or with a hot melt impregnating agent.

21. A filter element according to claim 13, wherein at least one of the cellulose-containing filter layers includes up to 50% of synthetic fibers.

22. A filter element according to claim 21, wherein said synthetic fibers are polyester fibers or glass fibers.

23. A filter element according to claim 13, wherein the filter element is disposed in a lubricating oil circuit of an internal combustion engine.

24. A filter element according to claim 13, wherein said filter element is disposed in a fuel line of an internal combustion engine.

25. A filter element comprising a plurality of filter medium layers joined together such that a fluid to be filtered flows successively through the layers in a flow direction commencing with an inflow layer and ending with a discharge layer, wherein successive layers in said flow direction exhibit an increasing degree of separation and a decreasing storage capacity for particles to be filtered out of said fluid, and wherein said inflow layer is comprised of a predominantly cellulose-containing filter paper with a weight per unit area of 50 to 200 g/m^2, and said discharge layer is comprised of a predominantly cellulose-containing filter paper with a weight per unit area of 50 to 200 g/m^2.

26. A filter element according to claim 25, wherein the inflow layer is a predominantly cellulose-containing filter paper with a weight of 50 to 200 g/m^2 and having a one-sided impregnating coating on the outflow side of the filter medium, and wherein the discharge layer is a continuously impregnated, predominantly cellulose-containing filter paper with a weight of 50 to 200 g/m^2.

27. A filter element according to claim 25, wherein the filter media joined together to form the filter element are star-folded.

28. A filter element according to claim 25, wherein the layers of filter medium are welded together by ultrasound.

29. A filter element according to claim 25, wherein the layers of filter medium are joined together by surface pressure during a folding process.

30. A filter element according to claim 25, wherein the layers of filter medium are adhesively bonded together by gluing with powdered adhesive or with a hot melt impregnating agent.

31. A filter element according to claim 25, wherein at least one of the cellulose-containing filter layers includes up to 50% of synthetic fibers.

32. A filter element according to claim 31, wherein said synthetic fibers are polyester fibers or glass fibers.

33. A filter element according to claim 25, wherein the filter element is disposed in a lubricating oil circuit of an internal combustion engine.

34. A filter element according to claim 25, wherein said filter element is disposed in a fuel line of an internal combustion engine.

In the abstract:

After the last page of the claims, please insert the Abstract of the Disclosure found on the accompanying sheet.

REMARKS

The foregoing amendments are respectfully submited to insert recommended section headings, to delete improper references to the claims from the specification, to present claims in better form for examination by the U.S. Patent and Trademark Office, and to add the required abstract of the disclosure.

Favorable action on the application is earnestly solicited.

Respectfully submitted,

July 28, 2000

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Specification

Filter Element

State of the Art

The invention relates to a filter element especially for filtering fluids according to the preamble of the main claim.

It is known that different types of filter material can be used in known filter elements, combined to produce an optimum filter behavior for the particles to be filtered out and the fluid flowing through. For example, it is known from DE 44 43 158 A1 to use a melt-blown material as the filter medium in a gas stream together with a carrier material serving exclusively for stabilization.

It is also known from WO 96/34673 to locate a plurality of filter layers made of a melt-blown material on a carrier layer in a hollow cylindrical filter element. The layers then form together a replaceable filter element that can be placed in a filter system.

The sequential arrangement of nonwoven filter media made of synthetic fibers with staggered filter fineness is known from US Patent 5,496,627 and WO 95/17946, with the filter fineness of the filter layers increasing in the flow direction.

It is also known from US Patent 5,427,597 and WO 96/34673 to arrange several filter layers or only one filter layer of a nonwoven web made by the melt-blowing process on a carrier layer which serves primarily for stabilization. The filtering effect of the carrier layer is negligible in comparison to the other layers.

The processing of synthetic filter nonwoven webs, especially melt-blown nonwoven webs, to produce filters requires the use of support materials. For example, metal wire cloth or even cellulose-based filter papers are used for this purpose. When cellulose-based supporting layers have heretofore been used, only filter layers exhibiting a much smaller degree of separation than the synthetic filter layer have been used. In such case, the supporting layer has no influence on the filtration properties of the overall arrangement but requires a considerable amount of space. Overall, in this known concept, only a certain part (for example, 30%-50%) of the volume of the overall arrangement is used for filtration.

Object of the Invention

It is the object of the invention to provide a filter element of the type described above such that the filtering effect is improved overall by a multilayer design and can be maintained over an extended period of time.

Advantages of the Invention

The filter element according to the invention is advantageously suited to achieve the stated object with the features of the main claim. In the filter elements according to the invention, several layers of a filter medium are arranged sequentially in the direction of flow through the filter with the filter fineness increasing in the direction of flow through the filter and with decreasing contaminant holding capacity of the individual layers to improve the overall capacity at a given filter fineness or to increase the filter fineness at a given capacity.

Advantageously, in a filter element according to the invention, the functions of foldability, support of the synthetic layers, and very fine filtration are integrated in the cellulose layer located on the outflow side. In contrast to the known

arrangements, in the invention the entire filter volume is used for particle separation in a system with filter fineness increasing in the flow direction, whereby the finest filter layer is constructed as a cellulose-based filter layer in particular and not as a synthetic filter layer (for example, a melt-blown material).

With the invention, improvement of the processibility and an increase in mechanical stability to produce self-supporting filter elements folded in a star shape, especially for economical manufacture on rotating embossing folding machines, is furthermore achieved. The advantages of the arrangement according to the invention regarding filtration properties, utilization of space, and processibility are also obtained when the cellulose fibers also have larger diameters than the synthetic fibers.

In one preferred embodiment of the filter element according to the invention, the above-described cooperation of the various degrees of separation and storage capacities of the different layers is achieved by the fact that the inflow-side filter medium is comprised of a cellulose-containing filter paper and the outflow-side filter medium likewise is comprised of a cellulose-containing filter paper. In such a case, a suitably adjusted admixture of cellulose fibers in a paper filter produces a corresponding filtration effect of the respective layer as mentioned above.

The cellulose-containing filter papers can also have a foreign substance content of up to 50%, with the foreign substances possibly being glass fibers or polyester fibers.

In another embodiment, in an advantageous fashion, the in-flow side filter medium is a melt-blown material or is made of synthetic fibers and the outflow-side filter medium is a foldable filter paper.

The use according to the invention of so-called melt-blown nonwoven webs as a layer of a filter medium is extremely advantageous since these materials have

a very high storage capacity for particles filtered from the fluid with a low resistance to flow through the filter by the medium to be filtered. This advantage is achieved by the small fiber diameter (approximately < 2 µm) and the high porosity of the melt-blown nonwoven material. The filtering effect, especially the degree of separation, initially increases with the accumulation of filtered-out particles during the period of use. The filter fineness of the layer on the inflow side is chosen so that a sufficiently long service life for the filter element can be achieved with this degree of fineness.

In order to achieve a high degree of separation by the overall arrangement even in the initial phase of use of the filter element, here as well a filter paper with additives containing cellulose can advantageously be used as the outflow side layer. This material, even in the initial phase, exhibits a very high degree of separation for the particles to be filtered out, but with a storage capacity lower than that of melt-blown nonwoven web. All in all, a relatively long operating life can be achieved in all embodiments with at least two layers while simultaneously maintaining the high degree of separation of the filter element.

Advantageous embodiments can be formed by the fact that on the inflow side a melt-blown fleece with about 15 to 150 g/m^2 weight per unit area and on the outflow side a filter paper containing cellulose with about 50 to 200 g/m^2 weight per unit area are used. PP (polypropylene) can be used for example as a starting material for the melt-blown fleece, especially for non-aggressive fluids or PES (polyethersulfone) which can also be employed in the filtration of fuel or hydraulic oils and lubricating oils.

The good degree of separation of the finest filter layer is achieved here by compressing the fibers during the manufacturing process or by mechanical compression (calandaring) of the cellulose layer following the manufacturing process. It is especially advantageous in this context that compressed cellulose layers, even with very limited thickness, possess sufficient mechanical stability

and hence a sufficient supporting function of the synthetic filter layer as well as sufficient mechanical strength of the entire filter system.

An advantageous further refinement of the filter element according to the invention is obtained when a third layer of a calendared melt-blown material is disposed between the inflow-side filter medium and the outflow-side filter medium.

Advantageous further processing of the filter layers according to the invention with the described gradient structure as far as storage capacity and degree of separation are concerned is preferably achieved by the fact that the assembled layers of filter media are star-folded to form the filter element. In particular the layers of filter media can be welded by ultrasound or joined by applying surface pressure during the folding process before or during folding, for example on an embossing and folding machine. The layers can also be glued with an adhesive whereby a powdered adhesive or a hot melt impregnating agent also can be used.

The field of application for the filter element according to the invention includes, for example, oil filter systems, especially for a motor vehicle. The multilayer filter elements described above are clearly superior to the known single-layer filter media as far as resistance to flow through the filter and capacity are concerned. Adjusted combinations of a few basic elements for the filter media permit a wide range of variation in filter properties so that increased service lives with existing structural volumes, increased filter fineness without negatively affecting service life, and a lower resistance to flow through the filter can be achieved with relatively simple means.

Additional advantageous embodiments are described in the subclaims.

Drawing

Embodiments of filter elements according to the invention will be explained with reference to the drawing.

Figure 1 shows a section through a filter element with an inflow-side layer of melt-blown nonwoven web and a outflow-side layer of cellulose-containing filter paper;

Figure 2 shows a section through a filter element according to Figure 1 with an intermediate layer;

Figure 3 shows a section through a filter element with an inflow-side layer and an outflow-side layer of cellulose-containing filter paper;

Figure 4 is a schematic diagram of an example of star folding; and

Figure 5 shows a graph of the degree of separation which depends on the loading of the filter element with accumulated particles.

Description of Working Embodiments

Figure 1 shows a section through a filter element 1 with an inflow-side layer 2 of melt-blown nonwoven fleece and an outflow-side layer 3 of cellulose-containing filter paper. The melt-blown nonwoven fleece of layer 2 can be made for example with a fiber material having a weight per unit area of about 15 to 150 g/m^2 and on the outflow-side layer 3 can be made with cellulose-containing filter paper having a weight per unit area of approximately 50 to 200 g/m^2.

The starting material for the melt-blown nonwoven web may be, for example, PP (polypropylene), especially for non-aggressive fluids, or PES (polyethersulfone).

In an embodiment of a filter element 4 according to Figure 2, a third layer 5 of a calendared melt-blown material is arranged between the inflow-side layer 2 and the outflow-side layer 3.

Another preferred embodiment of a filter element 6 is illustrated in Figure 3. Here the inflow-side filter medium is composed of a layer 7 of a cellulose-containing filter paper, and a layer 8 which forms the outflow-side filter medium likewise is made of a cellulose-containing filter paper. In this embodiment, an appropriate filtering effect of the respective layer is obtained by an appropriately adapted mixing of cellulose fibers into a paper filter medium, as described further below.

For further processing of the filter layers of filter element 1, 4, or 6 described with reference to Figures 1 to 3, the adjacently assembled layers of the filter media are star-folded according to the sketch in Figure 4 to form a filter element 9. In this case the layers of filter media can be assembled to each other before or during folding, by ultrasonic welding, by gluing, or by surface pressure during the folding process, for example on an embossing and folding machine.

To make the various filtering effects clear, according to a diagram in Figure 5, curves are shown for the progression of the degree of separation (%) which depends on the particle load (g/m^2) of the filter element. Here the curve shows for example a curve 10 for the inflow-side layer 2 (see Figure 1) consisting of a melt-blown nonwoven web, and curve 11 shows the progression for the outflow-side layer 3 (see Figure 1) made of a cellulose-containing paper material. Curve 12 shows the effect of a combination of the two layers 2 and 3 according to Figure 1.

It can be seen from the diagram in Figure 5 that when the particle loading begins on the inflow side, a layer 2 of a filter medium is produced with a high storage capacity and low degree of separation for the particles to be filtered out, and on the outflow side there is a layer 3 of a filter medium with a low storage capacity and high degree of separation for the particles to be filtered out.

Patent Claims

1) Filter element in which a plurality of layers (2, 3, 5; 7, 8) of a filter medium are assembled to each other in the throughflow direction, in which there is a degree of separation that increases in the throughflow direction for the particles to be filtered out with a storage capacity that decreases in the same throughflow direction, **characterized in that**

- the filter layer (2) on the inflow side is made of synthetic fibers and the filter layer (3; 8) on the outflow side is composed of a predominantly cellulose-containing filter paper.

2) Filter element in which several layers (2, 3, 5; 7, 8) of a filter medium are assembled to each other in the throughflow direction, in which there is a degree of separation increasing in the throughflow direction for the particles to be filtered out with a storage capacity that decreases in the same throughflow direction, **characterized in that**

- the inflow-side layer (2) is composed of a predominantly cellulose-containing filter paper with a weight per unit area of 50 to 200 g/m^2 and the clean-side outflow-side layer (3)is composed of a predominantly cellulose-containing filter paper with a weight per unit area of 50 to 200 g/m^2.

3) Filter element according to claim 2, **characterized in that**

- the inflow-side layer (2) is composed of a predominantly cellulose-containing filter paper with a weight per unit area of 50 to 200 g/m^2 and a one-sided impregnated coating is disposed on the outflow side of the filter medium and in that
- the clean-side layer (3) is composed of a predominantly cellulose-containing and continuously impregnated filter paper with a weight per unit area of 50 to 200 g/m^2.

4) Filter element according to claim 1, **characterized in that**
- the inflow-side layer (2) is composed of a melt-blown nonwoven web with a weight per unit area of approximately 15 to 150 g/m^2 and the clean-side layer (3) is composed of a predominantly cellulose-containing, optionally calendared or compressed, filter paper with a weight per unit area of about 50 to 200 g/m^2.

5) Filter element in which three layers (2, 5, 3) of a filter medium are assembled to each other according to claim 1, **characterized in that**
- the outflow-side layer (3) is composed of a predominantly cellulose-containing filter paper and can be used primarily to stabilize the filter element and that
- all the other layers (2, 5) are nonwoven materials made of synthetic fibers wherein these filter layers exhibit an increasing degree of separation in the direction of flow through the filter for the particles to be filtered out while the storage capacity decreases at the same time.

6) Filter element according to claim 5, characterized in that
- an optionally calendared melt-blown nonwoven web with a weight per unit area of 15 to 150 g/m^2 is arranged as a third layer (5) between the inflow-side filter medium and the outflow-side filter medium.

7) Filter element according to one of the foregoing claims, **characterized in that**
- the filter media assembled to each other to form the filter element (9) are star-folded.

8) Filter element according to one of the foregoing claims, **characterized in that**
- the layers (2, 3, 5; 7, 8) of the filter media are welded by ultrasound.

9) Filter element according to one of claims 1 to 7, **characterized in that**
- the layers (2, 3, 5; 7, 8) of the filter media are assembled to each other by surface pressure during a folding process.

10) Filter element according to one of Claims 1 to 7 **characterized in that**
- the layers (2, 3, 5; 7, 8) of the filter media are assembled to each other by gluing with powdered adhesive or with a hot melt impregnating agent or by surface pressure during a folding process.

11) Filter element according to one of the foregoing claims, **characterized in that**
- one or more of the cellulose-containing filter layers has a percentage of up to 50% of synthetic fibers, especially polyester or glass fibers.

12) Filter element according to one of the foregoing claims, **characterized in that**
- the filter element is used as a main or side stream filter in an oil or fuel filter system, especially for a motor vehicle.

ABSTRACT OF THE DISCLOSURE

A filter element in which several layers (2, 3, 5, 7, 8) made of a filtering medium are joined contiguously in the direction of flow with at least one layer (2, 7) made of a filtering medium with a high storage capacity and a low degree of separation being arranged on the in-flow side and at least one layer (3, 8) made of a filtering medium with a low storage capacity and a high degree of separation being arranged on the out-flow side. Preferably the in-flow filtering medium is made of a filter paper containing cellulose or of a melt-blown material, and the out-flow side filtering medium is produced from a filter paper containing cellulose.

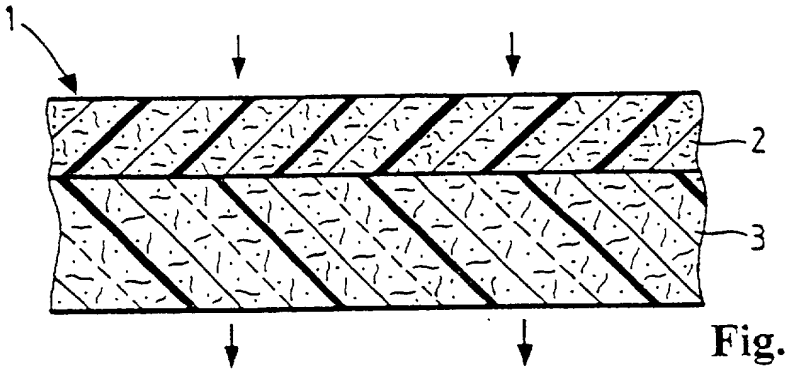

Fig.1

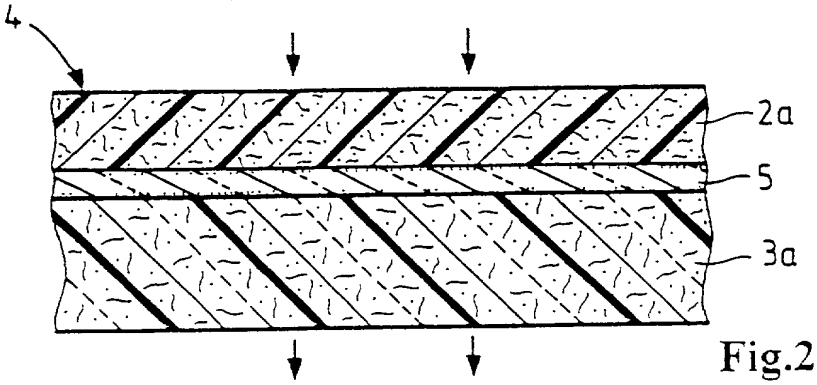

Fig.2

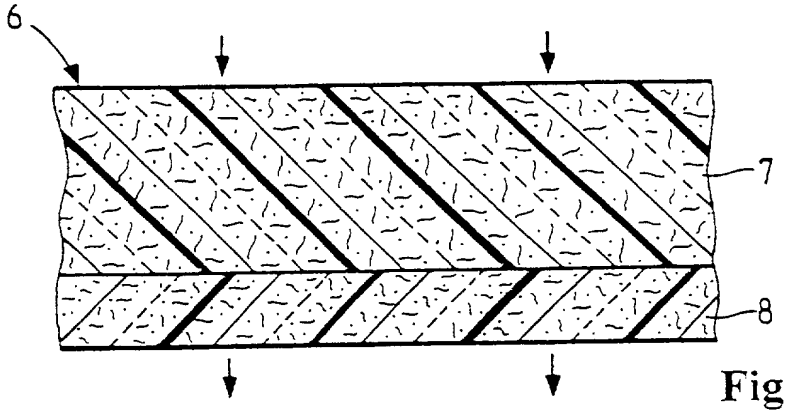

Fig.3

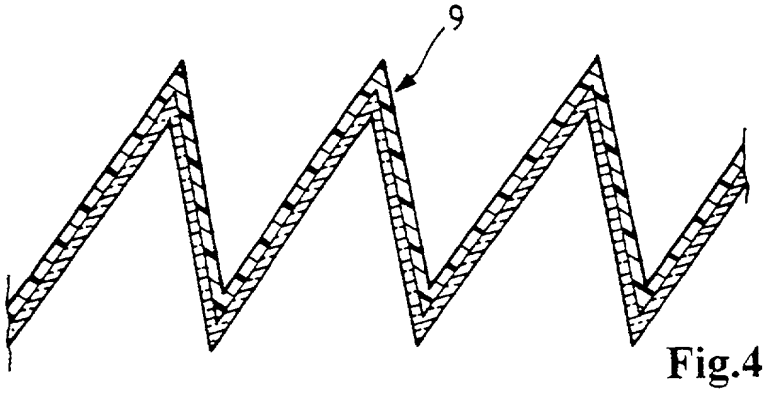

Fig.4

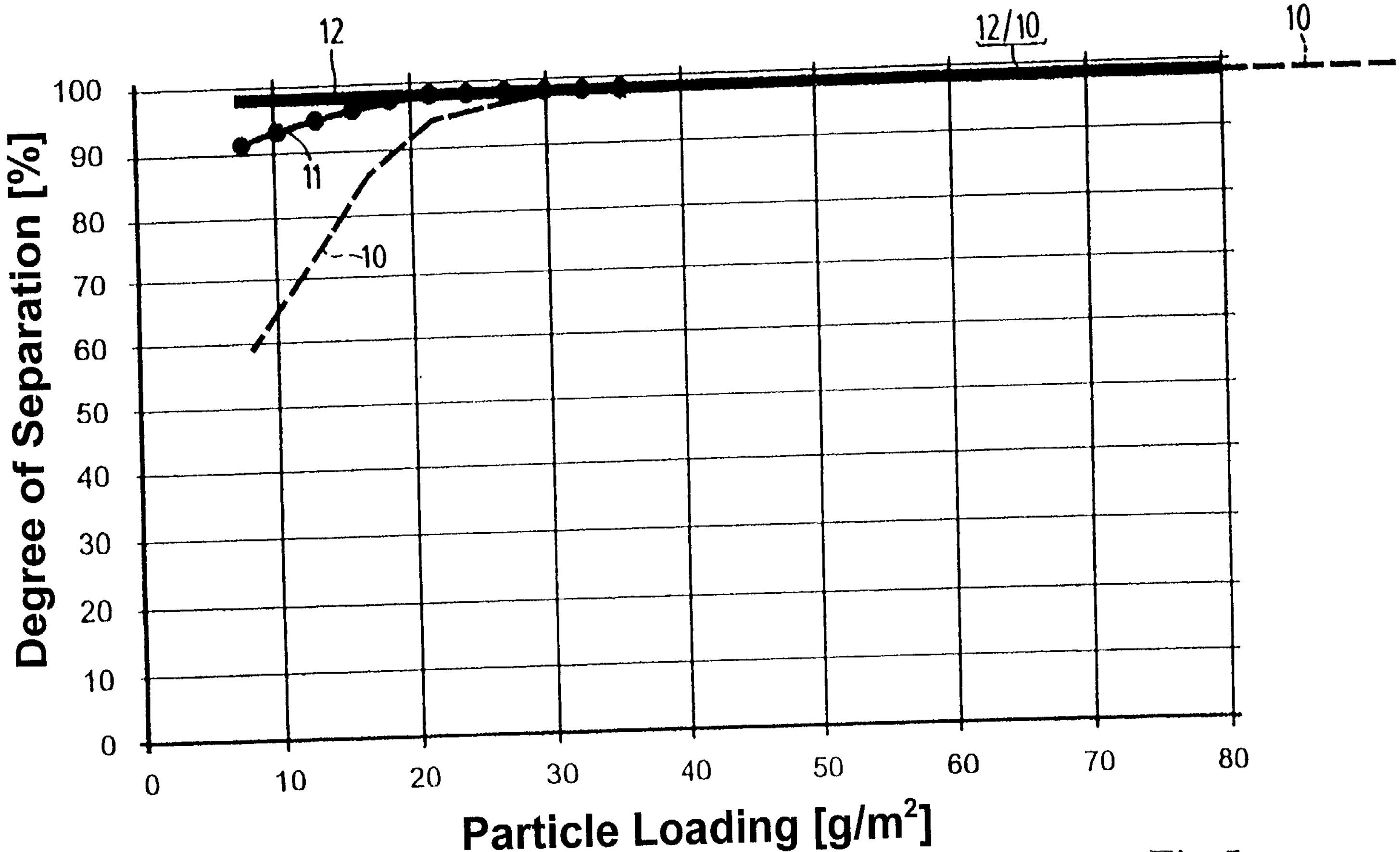

Fig.5

09/555140

1022-US

Attorney Docket No. 178/48916

DECLARATION AND POWER OF ATTORNEY - PATENT APPLICATION

As a below named inventor, I hereby declare that my citizenship, postal address and residence are as stated below; that I verily believe I am the original, first and sole inventor (if only one inventor is named below) or a joint inventor (if plural inventors are named below) of the invention entitled:

FILTER ELEMENT

the specification of which

___ is attached hereto, or

_X_ was filed on 20 Nov. 1998 as Application Serial No. PCT/EP98/07487 and was amended on __ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to be material to patentability as defined in 37 CFR §1.56. I hereby claim foreign priority benefits under Title 35, United States Code §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)			Priority Claimed
197 52 143.6	Fed. Rep. of Germany	25 Nov. 1997	yes
(Number)	(Country)	(Day/Month/Year)	
(Number)	(Country)	(Day/Month/Year)	

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose all information known to be material to patentability as defined in 37 CFR §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status)

I hereby appoint as principal attorneys James F. McKeown, Reg. No. 25,406; Donald D. Evenson, Reg. No. ~~26,160~~; Gary R. Edwards, Reg. No. 31,824; Joseph D. Evans, Reg. No. 26,269; ~~Herbert~~ I. Cantor, Reg. No. 24,392, and Jeffrey D. Sanok, Reg. No. 32,169 to prosecute and transact all business in the ~~Patent and~~ Trademark Office connected with this application and any related United States and international applications. Please direct all communications to:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under §1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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12. 6. 2000 — Date

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